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ABSTRACT

The relationship between graduate enrollment in Canada, at both the master's and the doctoral level, and the number of graduate degrees granted by level and field of study and selected disciplines was examined. The enrollment for each of the four years (1970-1971 through 1973-1974) was related to the degrees granted in the same year. An average proxy for the four-year period was also developed. Part-time master's enrollment was converted to full-time equivalent enrollment to compensate for the fact that there was no way to know if a graduate degree resulted from full- or part-time study. On the average, 41.5 percent of the full-time equivalent enrollment graduated with a master's degree each year, and 13.8 percent graduated with a doctoral degree. Data are presented for the years 1970-1971 through 1973-1974 on the ratio between master's degrees awarded and full-time equivalent enrollment and the ratio between doctoral degrees awarded and Ph.D. enrollment by field of study and by discipline within the following fields: humanities, social sciences, agriculture and biological sciences, health sciences, and mathematics and physical sciences. For the years 1968 through 1975, data are presented on the ratios between degrees awarded and enrollment at the master's and doctoral level by field of study and by discipline within the following fields: humanities, life sciences, social sciences, engineering and applied sciences, and physical sciences. The results of the study are discussed briefly, and problems with the data and with the approach are mentioned. (SC)

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THE RELATIONSHIP BETWEEN GRADUATE DEGREES AWARDED AND ENROLMENT BY LEVEL AND BY DISCIPLINE

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TABLE OF CONTENTS

	Page
Introduction	5
The Ratio at the Master's Level	6
The Ratio and the Doctoral Level	8

LIST OF TABLES

Table		Page
1	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment by Field of Study, 1970-71 to 1973-74	13
2	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in Humanities by Discipline, 1970-71 to 1973-74	14
3	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in Social Sciences by Discipline, 1970-71 to 1973-74	15
4	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in Agriculture and Biological Sciences by Discipline, 1970-71 to 1973-74	16
5	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in Health Sciences by Discipline, 1970-71 to 1973-74	17
6	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in Mathematics & Physical Sciences by Discipline, 1970-71 to 1973-74	18
7	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment by Field of Study, 1968 to 1975	19
8	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in the Humanities by Discipline, 1968 to 1975	20
9	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in the Social Sciences by Discipline, 1968 to 1975	21
10	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in the Life Sciences by Discipline, 1968 to 1975	22
11	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in the Engineering and Applied Sciences by Discipline, 1968 to 1975	23

Table		Page
12	Ratio Between Masters Degrees Awarded and Full-Time Equivalent Enrolment in the Physical Sciences by Discipline, 1968 to 1975	24
13	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment by Field of Study, 1970-71 to 1973-74	25
14	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Humanities by Discipline, 1970-71 to 1970-71 to 1973-74	26
15	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Social Sciences by Discipline, 1970-71 to 1973-74	27
16	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Agriculture & Biological Sciences by Discipline, 1970-71 to 1973-74	28
17	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Health Sciences by Discipline, 1970-71 to 1973-74	29
18	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Mathematics & Physical Sciences by Discipline, 1970-71 to 1973-74	30
19	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment by Field of Study, 1968 to 1975	31
20	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Humanities by Discipline, 1968-1975	32
21	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Social Sciences by Discipline, 1968-1975	33
22	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Engineering and Applied Sciences by Discipline 1968-1975	34

Table		Page
23	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Physical Sciences by Discipline, 1968-1975 ----------	35
24	Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Life Sciences by Discipline, 1968-1975 ----------	36
25	Ratio Between Doctoral Degrees Awarded and Doctoral Enrolment by Selected Universities and Four Fields of Study, 1969-70 to 1975-76 ----------	37

Introduction

Report IV of this series deals with the relationship between enrolment, both at the master's and doctoral level, and the number of graduate degrees granted by level and field of study and selected disciplines.

Part I of this four-part series focused on the number of degrees granted for these disciplines by level of study, and Part II treated the full- and part-time enrolment. These two reports have been used to develop the ratio between enrolment and degrees granted.

Ideally it would have been preferable to use a model which would have been based on a cohort approach (i.e. that the master's enrolment would have been produced one to two years after the master's degrees awarded). For Statistics Canada data, this approach was not feasible because only for four years (1970-71 to 1973-74) were the data available. Consequently, in addition to relating the enrolment for one year to the degrees in the same year, an average proxy for the four-year period has been developed. Since it is impossible to know if a graduate degree is obtained from full- or part-time study, the part-time master's enrolment has been converted to full-time equivalent enrolment by a ratio of 3 to 1 and added to the full-time master's enrolment.

The information from the Canadian Association of Graduate Schools for an eight-year period (1968 to 1975) gives a longer time series. The classification system by field of study and selected discipline varies slightly from those of Statistics Canada, as already discussed in Part I, II and III of this series.

The Ratio at the Master's Level

From the Statistics Canada data, for the four-year period, on the average 41.5% of the full-time equivalent enrolment graduated with a master's degree each year with a high of 44.8% in 1972-73 and a low of 40.1% in 1970-71 (Table 1).

This meant that from an enrolment of 100, 42 had graduated with a master's degree. There exists a number of difficulties with this type of analysis. One does not know if the students were enrolled in a one-year master's program such as those with an honours bachelors degree or if they were registered in a two-year program starting with a general degree or being enrolled in a professional degree program of a two-year duration. Moreover, full- and part-time students have been combined because one does not distinguish if a master's degree has been obtained through either full- or part-time study (or a combination of the two). This type of information might provide a trend analysis and could show variations by eight fields of study. For example, the average ratio for fine arts was 30.9 and 50.8 in education. This difference might also be due to the fact that in certain disciplines it is more likely that a master's thesis is required than in professional programs such as education or business administration. The variation by the six other fields were not as marked and were all in the neighbourhood of 40.

Turning to individual disciplines, library science had an average ratio of 64.1 with 33.8 in philosophy (Table 2). In the social science disciplines, such as social work, the ratio was 52.9 and 21.3% in law (Table 3). In veterinary medicine, the ratio was 62.1, but in the 30's for most of the other biological sciences (Table 4). In the phsyical and mathematical sciences the average ratio was 40.5 with a high of 44.4 in physics and 36.1 in chemistry (Table 6).

This exercise does not permit to draw firm conclusions for the above-mentioned reasons about withdrawal rates or length of study for master's degrees, the evidence is indirect. The same information from the Canadian Association of Graduate Schools provides a somewhat similar pattern for this type of ratio. (Tables 7 to 12).

For the five fields of study the average ratio covering the eight-year period from 1968 to 1975 was 37.8, with a high of 39.9 in the social sciences and a low of 30.4 in the life sciences (Table 7).

For all five fields of study, the ratio was 43.6 in 1972 with a low of 31.3 for both 1968 and 1969. Since the ratio varied for each year it is advisable to utilize the average ratio for the eight-year period. For most disciplines the ratio was in the neighbourhood of 40.0. It should be remembered that part-time students have been converted by a ratio of 3 to 1 to full-time equivalent master's enrolment. The ratio between master's degrees awarded and only full-time enrolment would have been appreciably different, particularly for those disciplines in the human sciences which have a large part-time enrolment with a considerable length of study and a substantial withdrawal rate.

Part-time enrolment is particularly large in education and business administration. The eight-year average ratio in library science and social work has been 51.2 and 45.8 respectively substantially higher than the 39.9 which was the average for the other social science disciplines. History and philosophy ratios were 34.0 and 32.9 in contrast to mathematics where the same was 48.7. If one considers that for many honours graduates, the anticipated time for the completion of a master's degree is one year and most professional programs are of a two-year duration, the ratio seems to indicate a considerably long period of study as well as a substantial withdrawal rate, but this type of evidence is indirect and further study is needed to verify this hypothesis.

The Ratio at the Doctoral Level

At the doctoral level there is much greater variety by field of study. The four-year average is 13.8 with a high in the neighbourhood of the 20's for the natural sciences and a low of 7.4 for the humanities and 8.4 for the social sciences (Table 13).

This clearly shows that a sizeable number of doctoral students have either not completed their doctoral degree within a stipulated time frame or else have withdrawn completely. It is generally assumed that from the master's level or equivalent, it should take three to four years in the natural sciences and 4-5 years in the human sciences, although the formal requirements assume 1-2 years residence plus the completion of the dissertation. The low ratio of doctoral programs in the humanities and

social sciences is a cause for concern, even if some of those students complete their doctoral degree on a part-time basis. As an illustration, for the 4-year period only 7.7 graduated with a doctorate degree in history and 5.7 in French (Table 14). In a hypothetical situation, assuming a five-year study period the ratio could have been 20.0 provided that there were no withdrawals and all students studying full-time.

Since we know that in recent years from the 13,000 full- and part-time doctoral students, 10,000 were full-time alone, and many of those part-time students classified as such were actually studying full-time, mostly at the dissertation stage, there is no valid basis for the claim that part-time students are the main reason for the low ratio in the humanities and social sciences. Other reasons must exist for the substantial variations among the human sciences and the natural sciences. As an example, the ratio for political science shows 5.3 as compared with 24.3 in chemistry, similarly sociology has a ratio of 5.4 in comparison with 21.4 in agriculture and 22.6 in medicine. (Tables 15 to 18). In the draft report "The Ph.D. Dilemma Revisited" the author explores some of the reasons for such marked variations in these ratios.

The same ratio has been developed from the information obtained by the Canadian Association of Graduate Schools for an eight-year period (1968-1975) showing a similar pattern by field of study and selected disciplines.

Since the number of degrees granted is recorded on a calendar year basis whereas the enrolment is based on the academic year, the ratio has been derived by relating for example the number of doctoral degrees

awarded in the calendar year of 1975 to the enrolment data of the academic year 1975-76, and this procedure is employed for the seven other years. It is noted that for 1968 and 1969 the data from the Canadian Association of Graduate Schools were incomplete. However, since this applies to both graduation and enrolment information no distortion in the ratio is likely to have occurred.

The only possible distortion exists if the enrolment grows rapidly which has happened in some of the disciplines of the human sciences and the graduation pattern occurs four to five years after. To smooth this situation and also to avoid unusual variations from year to year the discussion will focus on the eight-year average between 1968 and 1975.

The overall ratio for the five fields of study was 12.8 with a high of 19.1 in the physical sciences and 19.0 in the life sciences and a low of 7.0 in the humanities (including fine arts) and 8.7 in the social sciences (including education Table 19). It is interesting to note that this ratio in the humanities has increased from 5.6 in 1970 to 9.5 in 1975 and in the social sciences from 6.8 to 10.5. For the natural sciences the high point was achieved in 1973 when the ratio was 24.4 and 24.8, indicating that the cohort of those doctoral students who had enrolled in the late sixties graduated in that year.

The ratio average on a discipline basis reveals for the humanities disciplines a low in linguistics and fine and applied arts of 5.0 and a high of 8.8 for classics and 8.2 in religious studies (Table 20). Expressed differently it would have taken a cohort of 100 doctoral students in fine arts to graduate all in 20 years provided that there have been no withdrawals-

Even if half of them had dropped out it would have taken 10 years for all to graduate with a doctorate. In the case of classics it would have taken a cohort approximately 12 years to graduate.

The higher average for the 8 fields of study of 12.8 is due to the much larger number of doctoral graduates in the natural sciences accounting for about two-thirds of all graduates.

For the social sciences the variation by discipline was substantial varying from 5.1 in anthropology and political science to a high of 10.2 in education (17.9 in physical education) and 10.5 in psychology. (Table 21). Since many more are graduated in the latter disciplines the overall ratio for the social sciences is 8.7. In engineering disciplines the ratio did not vary much between 16.4 in electrical engineering and 20.0 of chemical engineering (Table 22). In the physical sciences, as already stated, chemistry had a ratio of 22.7 and physics of 20.3 whereas geology and mathematics were 15.2 (Table 23). For the 24 disciplines in the life sciences Table 24 provides the ratio.

Since 6 universities account for well above 60% of the doctoral degrees granted, ratios for these universities have been developed in order to show variations by selected institution and by field of study. (Table 25).

The ratios at Alberta and British Columbia were generally higher than at Laval and Montreal. For all universities, the ratio in the physical and applied sciences was often twice to three times higher than in the humanities and social sciences. With few exceptions, this ratio for these two fields was below 10.0 whereas for the physical and applied sciences this ratio was in the neighbourhood of 20.0. There were indications that

in the humanities and social sciences this ratio was increasing, in comparison to the physical and applied sciences which showed a declining trend in 1974-75 and 1975-76.

This pattern confirms the trend which existed for the total universe of graduate schools, and it is necessary to analyze thoroughly the variation by field of study as well as by discipline and institution.

Table 1

Ratio Between Masters Degrees Awarded and Full-time Equivalent Enrolment
by Field of Study, 1970-71 to 1973-74

Field of Study	1970-71	1971-72	1972-73	1973-74	4 Year Average
Fine and Applied Arts	31.9	31.5	29.1	31.3	30.9
Humanities	42.4	44.5	44.6	40.1	42.9
Education	43.1	51.0	58.8	50.3	50.8
Social Sciences	38.0	38.6	41.8	39.5	39.5
Engineering and Applied Sciences	44.9	40.7	43.2	38.7	41.9
Mathematics and Physical Sciences	40.3	41.4	42.9	37.5	40.5
Agriculture and Biological Sciences	34.6	35.7	37.2	31.3	34.6
Health Sciences	34.7	22.5	49.4	33.3	32.6
TOTAL	40.1	40.8	44.8	40.3	41.5

Table 2

Ratio Between Masters Degrees Awarded and Full-time Equivalent Enrolment in Humanities by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
English	40.9	49.8	45.7	41.9	44.5
French	34.9	45.3	36.6	36.4	38.4
Other Modern Languages	31.0	33.3	39.1	56.0	38.7
History	31.7	37.6	38.5	31.2	34.7
Library Science	63.2	51.7	73.4	68.9	64.1
Philosophy	29.7	35.5	45.1	26.6	33.8
Theology and Religion	64.9	49.1	40.9	32.5	44.2
TOTAL	42.4	44.5	44.6	40.1	42.9

Table 3

Ratio Between Masters Degrees Awarded and Full-time Equivalent Enrolment in Social Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Anthropology	27.1	34.0	26.5	31.6	30.0
Commerce & Business	42.8	42.2	45.4	43.2	43.4
Economics	38.2	40.6	58.0	45.0	44.9
Geography	29.6	28.2	31.2	26.1	28.7
Law	26.4	18.1	20.2	21.4	21.3
Political Science and Public Administration	35.8	36.7	33.7	36.9	35.7
Psychology	40.0	37.9	41.3	37.4	39.1
Social Work	50.0	53.1	53.4	55.9	52.9
Sociology	25.7	30.2	45.1	35.4	33.3
TOTAL	38.0	38.6	41.8	39.5	39.5

Table 4

Ratio Between Masters Degrees Awarded and Full-time Equivalent Enrolment in Agriculture and Biological Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Agriculture	41.6	34.9	52.1	34.7	40.3
Veterinary Medicine	44.8	128.6	82.4	41.7	62.1
Biology	31.4	34.0	33.6	29.5	32.1
Zoology	25.4	42.9	34.8	38.1	34.8
Botany	34.3	22.4	31.3	21.1	26.7
TOTAL	34.6	35.7	37.2	31.3	34.6

Table 5

Ratio Between Masters Degrees Awarded and Full-time Equivalent Enrolment in Health Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Dentistry	23.5	35.9	31.0	28.6	29.2
Medicine	37.1	18.1	51.4	49.3	33.4
Nursing	34.3	35.0	53.9	41.3	41.1
Pharmacy	24.4	56.6	36.2	31.4	35.5
TOTAL	34.7	22.5	49.4	33.3	32.6

Table 6

Ratio Between Masters Degrees Awarded and Full-time Equivalent Enrolment in Mathematics & Physical Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Chemistry	36.0	41.7	39.3	27.9	36.1
Geology	38.6	27.0	31.9	26.5	30.8
Mathematics	47.7	58.9	33.0	31.5	41.0
Physics (with meteorology)	41.4	44.8	48.8	43.7	44.4
TOTAL	40.3	41.4	42.9	37.5	40.5

Table 7

Ratio between Masters Degrees Awarded and Full-time Equivalent Enrolment by Field of Study, 1968 to 1975

Field of Study	8 Year Average	1968	1969	1970	1971	1972	1973	1974	1975
Humanities	36.7	33.1	31.7	34.5	43.0	43.0	39.3	35.5	33.9
Social Sciences	39.9	32.6	31.4	37.9	40.4	44.7	44.9	42.0	40.2
Engineering & Applied Sciences .	38.5	33.6	36.8	42.2	43.0	48.4	41.0	36.5	29.6
Physical Sciences ..	37.2	28.6	32.7	36.8	46.7	40.8	42.8	37.0	34.3
Life Sciences	30.4	25.3	24.5	30.8	36.8	37.2	35.7	28.9	26.9
Total	37.8	31.3	31.3	36.7	41.4	43.6	42.4	38.4	36.1

Source: Canadian Association of Graduate Schools.

Table 8

Ratio between Masters Degrees Awarded and Full-time Equivalent Enrolment in the Humanities by Discipline, 1968 to 1975

Discipline	8 Year Average	1968	1969	1970	1971	1972	1973	1974	1975
Fine and Applied Arts	28.9	26.5	30.4	33.1	31.9	30.2	27.5	27.4	26.3
Classics and Latin	43.4	34.5	40.2	37.1	88.5	44.0	49.2	35.5	31.6
English Language and Literature ...	39.9	33.6	33.9	33.9	50.7	50.1	42.0	40.5	37.9
French Language and Literature	37.0	30.5	26.3	30.3	40.2	44.4	46.5	47.0	41.7
History	34.0	32.8	29.8	32.0	38.4	37.7	40.8	34.6	27.9
Linguistics	22.9	21.9	10.3	21.8	25.5	30.2	26.7	15.4	26.7
Modern Language and Literature	35.6	28.0	30.9	42.0	47.1	38.2	40.1	30.4	32.1
Philosophy	32.9	31.3	27.0	33.0	38.3	39.4	37.4	27.4	31.1
Theology and Religion	49.3	47.6	50.6	59.7	63.4	50.4	39.7	39.5	44.4
Other*	40.8	35.9	38.3	27.4	27.1	56.5	42.8	49.8	41.3
Total	36.7	33.1	31.7	34.5	43.0	43.0	39.3	35.5	33.9

* Includes Asian and Slavic Studies, Comparative Literature, and Medieval Studies.
Source: Canadian Association of Graduate Schools.

Table 9

Ratio between Masters Degrees Awarded and Full-time Equivalent Enrolment in the Social Sciences by Discipline 1968 to 1975

Discipline	8 Years Average	1968	1969	1970	1971	1972	1973	1974	1975
Anthropology	27.4	25.3	35.3	23.9	27.4	26.5	32.3	24.3	26.4
Archaeology	15.8	44.4	4.2	4.2	5.3	6.1	20.0	22.2	33.3
Business	39.4	30.0	34.5	45.0	43.6	43.6	39.0	37.3	40.6
Economics	33.0	23.5	20.2	24.2	32.5	43.0	48.1	41.7	35.3
Education	49.7	41.8	40.7	47.1	47.2	55.8	55.3	53.5	48.3
Geography	27.3	28.7	21.7	28.8	26.8	32.5	27.7	23.9	28.8
Law	29.6	69.4	16.9	16.1	10.8	36.1	33.5	33.6	35.4
Library Science	51.2	44.4	30.4	36.6	43.1	55.7	62.0	61.8	59.9
Physical Education	33.6	36.8	38.7	32.4	31.5	36.7	36.4	27.9	33.3
Political Science and Public Administration	34.6	25.3	21.7	36.5	42.1	40.8	45.5	35.8	30.4
Psychology	38.9	42.5	34.3	38.9	46.7	36.3	38.9	37.6	37.4
Social Welfare	45.8	36.1	36.8	38.6	42.2	49.8	57.0	56.9	45.0
Sociology	30.3	18.4	22.8	25.4	32.8	35.6	40.5	35.5	33.6
Other*	27.3	26.6	21.1	28.2	23.5	30.6	27.8	27.8	28.8
Total	39.9	32.6	31.4	37.9	40.1	44.7	44.9	42.0	40.2

* Includes Canadian Studies, Journalism and Communication, Urban and Regional Planning.
Source: Canadian Association of Graduate Schools.

Table 10

Ratio between Masters Degrees Awarded and Full-time Equivalent Enrolment in the Life Sciences by Discipline, 1968 to 1975

Discipline	8 Year Average	1968	1969	1970	1971	1972	1973	1974	1975
Agriculture	33.4	22.8	29.3	37.8	50.0	42.9	48.5	27.9	25.0
Anatomy	34.6	18.9	45.0	28.6	31.8	77.8	44.1	30.0	25.0
Animal Science	37.4	29.2	34.1	37.3	56.5	48.7	46.6	38.8	19.0
Biochemistry	28.9	29.8	19.3	30.6	39.7	40.2	31.0	29.8	19.9
Biology	27.8	15.7	20.5	19.8	33.9	28.7	29.5	25.0	69.6
Biomedial Engineering	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biophysics	26.7	29.6	35.5	20.0	37.8	58.1	13.3	12.8	14.0
Botany	26.6	27.4	19.2	41.6	30.3	22.5	26.3	28.6	18.3
Cancer Research	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Clinical Medical Sc.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dentistry	27.8	21.2	14.3	18.9	34.1	47.1	41.9	30.2	21.6
Entomology	34.4	28.3	39.0	35.5	21.9	41.3	44.2	28.9	34.0
Epidemiology	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Food Science and Nutrition	29.4	13.3	24.8	37.4	42.9	32.6	31.5	27.8	27.5
Forestry	33.0	21.0	32.0	37.5	36.5	34.0	34.7	28.0	39.6
Genetics	24.4	21.3	16.7	38.9	58.3	36.4	15.0	15.0	26.1
Hospital Administration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Marine Science	17.2	21.1	26.1	5.6	28.6	20.6	31.6	11.5	12.3
Medical Sciences	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medicine	26.7	18.4	12.5	25.0	32.9	40.8	25.8	35.7	39.3
Microbiology and Immunology	33.0	45.1	30.1	38.8	36.8	37.0	35.8	30.6	19.1
Neuroscience	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nursing	35.7	16.2	25.7	38.7	24.5	43.0	50.5	42.7	34.6
Pathology	36.2	36.2	28.8	49.1	34.3	31.6	41.7	44.4	20.0
Pharmacy/Pharmacology	38.5	27.4	18.4	35.4	35.7	40.0	63.5	45.3	45.2
Physiology	29.6	18.9	21.0	27.0	30.1	45.2	47.5	28.8	31.4
Plant Science	31.0	16.7	24.6	35.2	43.2	47.0	31.0	28.3	26.0
Psychiatry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Public Health Hygiene	31.6	35.3	24.7	32.9	32.4	48.8	21.4	21.7	76.5
Soil Science	36.9	33.8	38.9	47.1	41.7	22.9	52.9	32.1	28.6
Surgery	57.7	77.4	34.1	43.5	61.8	65.2	110.5	17.4	107.1
Veterinary Medicine	49.1	77.3	25.8	27.3	57.1	60.9	95.2	58.3	36.8
Zoology	29.8	30.5	26.1	36.1	40.0	37.4	25.0	26.4	21.5
Other (including Bacteriology)	26.2	11.6	10.7	15.6	18.6	13.8	3.5	4.9	11.0
Total	31.0	25.3	24.5	30.8	36.8	37.2	35.7	28.9	30.5

Source: Canadian Association of Graduate Schools.

Table 11

Ratio between Masters Degrees Awarded and Full-time Equivalent Enrolment in the Engineering and Applied Sciences by Discipline, 1968 to 1975

Discipline	8 Year Average	1968	1969	1970	1971	1972	1973	1974	1975
Architecture	26.8	37.9	25.0	25.0	20.2	37.7	32.0	21.8	22.8
Aerospace Science	49.5	60.3	40.0	50.9	47.5	60.0	54.3	57.6	33.3
Chemical Engineering	41.1	29.9	36.6	49.7	52.6	48.2	44.8	34.7	35.2
Civil Engineering	40.1	36.4	38.1	48.2	47.5	42.5	38.9	36.8	33.1
Electrical Engineering	36.0	28.8	37.4	37.7	40.4	37.8	46.9	36.6	25.4
Mechanical Engineering	40.8	33.4	34.2	43.8	44.5	54.2	42.3	45.0	32.4
Other*	39.1	36.3	38.9	34.0	40.0	65.1	37.5	34.7	33.4
Total	38.7	33.6	36.8	42.2	43.0	48.4	41.0	36.5	31.0

* Includes Engineering Design, Environmental Studies, Industrial and Mining Engineering, and Metal and Materials Science.
Source: Canadian Association of Graduate Schools.

Table 12

Ratio between Masters Degrees Awarded and Full-time Equivalent Enrolment in the Physical Sciences by Discipline, 1968 to 1975

Discipline	8 Year Average	1968	1969	1970	1971	1972	1973	1974	1975
Astronomy	50.6	26.9	50.0	40.6	72.7	80.0	61.5	47.1	47.4
Chemistry	30.6	22.8	24.9	29.4	48.7	40.1	34.0	22.1	30.6
Computer Science	34.8	17.3	16.9	20.1	39.8	40.1	54.3	52.1	24.3
Geology	24.9	25.6	23.8	27.5	31.7	24.9	22.4	21.9	23.2
Mathematics	48.7	31.6	49.2	55.0	53.7	50.6	53.3	46.2	53.2
Physics (including Meteorology)	41.4	36.3	36.9	36.9	52.0	44.2	48.0	42.5	38.1
Total	37.2	28.6	32.7	36.8	46.7	40.8	42.8	86.8	34.3

Source: Canadian Association of Graduate Schools.

Table 13

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment
by Field of Study, 1970-71 to 1973-74

Field of Study	1970-71	1971-72	1972-73	1973-74	4 Year Average
Fine and Applied Arts	8.3	8.7	6.1	4.4	6.7
Humanities	6.8	7.0	7.3	8.5	7.4
Education	8.8	11.0	11.3	10.8	10.6
Social Sciences	7.9	6.9	8.9	9.6	8.4
Engineering and Applied Sciences	15.4	17.8	20.8	22.6	19.1
Mathematics and Physical Sciences	19.2	19.7	22.3	21.1	20.5
Agriculture and Biological Sciences	22.3	19.5	22.5	21.8	21.5
Health Sciences	12.9	22.0	27.6	26.1	21.6
TOTAL	12.8	13.1	14.5	14.5	13.8

Table 14

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Humanities by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
English	7.2	6.3	7.8	8.3	7.4
French	5.3	5.4	5.2	7.1	5.7
Other Modern Languages	9.4	5.3	7.9	9.7	8.2
History	7.0	9.1	6.4	8.4	7.7
Philosophy	7.3	6.7	8.5	10.4	8.3
Theology and Religion	5.2	7.4	10.8	8.4	8.1
TOTAL	6.8	7.0	7.3	8.5	7.4

Table 15

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Social Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Anthropology	3.9	2.7	6.1	8.7	5.5
Commerce and Business	6.3	7.1	9.6	9.7	8.4
Economics	5.6	4.3	10.9	6.7	6.6
Geography	9.2	9.8	9.6	12.8	10.4
Law	22.7	15.6	7.9	6.7	13.4
Political Science and Public Administration	4.6	6.2	4.3	6.5	5.3
Psychology	12.8	10.7	11.1	11.3	11.4
Social Work	3.6	2.9	16.7	2.7	6.7
Sociology	3.9	4.5	5.6	7.0	5.4
TOTAL	7.9	6.9	8.9	9.6	8.4

Table 16

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment
in Agriculture & Biological Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Agriculture	17.1	20.2	25.8	22.9	21.4
Veterinary Medicine	23.1	42.3	25.9	23.7	27.7
Biology	13.1	25.0	23.5	17.9	19.6
Zoology	16.1	17.2	20.0	24.8	19.4
Botany	15.3	13.2	19.4	21.4	17.0
TOTAL	22.3	19.5	22.5	21.8	21.5

Table 17

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Health Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Dentistry	9.1	28.6	10.0	20.0	17.8
Medicine	13.7	22.8	29.0	27.5	22.6
Pharmacy	3.4	12.7	18.9	17.2	12.2
Other Health Sciences	14.3	20.7	20.0	11.1	16.4
TOTAL	12.9	22.0	27.6	26.1	21.6

Table 18

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment
in Mathematics & Physical Sciences by Discipline, 1970-71 to 1973-74

Discipline	1970-71	1971-72	1972-73	1973-74	4 Year Average
Chemistry	23.4	23.0	25.3	26.2	24.3
Computer Science	10.5	7.5	N/A	N/A	N/A
Geology	13.5	17.0	16.1	12.0	14.7
Mathematics	14.4	18.4	13.7	14.7	15.2
Physics (with Meteorology)	18.4	18.5	26.3	22.2	21.0
Other Mathematics & Physical Sciences	24.1	20.3	18.8	8.6	16.6
TOTAL	19.2	19.7	22.3	21.1	20.5

Table 19

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment by Field of Study, 1968 to 1975

Discipline	Average 1968 to 1975	1968	1969	1970	1971	1972	1973	1974	1975
Humanities	7.0	4.5	4.9	5.6	6.3	7.6	7.6	8.8	9.5
Social Sciences	8.7	9.2	8.4	6.8	8.1	8.0	9.5	8.3	10.5
Engineering & Applied Sciences	17.4	12.7	11.6	15.9	16.2	20.1	23.2	22.3	17.7
Physical Sciences	19.1	16.8	15.5	15.5	20.6	20.1	24.4	21.8	19.7
Life Sciences	19.0	13.8	14.0	17.2	18.8	22.1	24.8	21.6	20.3
Total	12.8	11.1	10.5	11.2	12.7	13.4	15.0	13.8	13.7

Source: Canadian Association of Graduate Schools.

Table 20

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Humanities by Discipline, 1968-1975

Discipline	Average 1968 to 1975	1968	1969	1970	1971	1972	1973	1974	1975
Fine and Applied Arts	5.0	0.0	1.7	6.9	5.3	11.0	3.3	4.3	4.8
Classics and Latin	8.8	6.6	4.4	3.9	5.0	12.4	17.3	13.8	10.3
English Language and Literature	7.1	4.1	5.7	0.1	6.3	7.6	6.5	8.3	9.9
French Language and Literature	5.9	3.9	5.1	5.7	4.3	5.0	7.5	7.6	8.7
History	7.5	6.0	3.2	5.4	6.9	8.7	7.5	10.0	11.2
Linguistics	5.0	2.0	0.0	6.1	2.4	3.8	5.0	6.9	9.0
Modern Languages and Literature	7.4	1.1	7.1	3.5	11.4	6.5	8.8	9.5	12.4
Philosophy	7.5	4.9	5.2	5.0	6.7	7.8	10.2	9.8	10.2
Theology and Religion	8.2	7.4	4.2	5.9	6.0	10.3	11.8	9.1	10.4
Other*	6.1	4.8	5.4	7.4	5.6	6.4	3.8	8.6	6.3
Total	7.0	4.5	4.9	5.6	6.3	7.6	7.6	8.8	9.5

* Includes Asian and Slavic Studies, Comparative Literature and Medieval Studies.
Source: Canadian Association of Graduate Schools.

Table 21

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Social Sciences by Discipline, 1968-1975

Discipline	Average 1968 to 1975	1968	1969	1970	1971	1972	1973	1974	1975
Anthropology	5.1	5.1	4.3	3.4	1.2	6.6	7.8	8.3	3.7
Archaeology	11.8	30.8	0.0	4.5	4.2	9.5	26.3	33.3	2.5
Business	7.9	5.0	2.0	4.5	4.7	6.5	7.1	8.9	16.7
Economics	6.2	6.1	4.2	2.4	5.0	6.5	8.0	8.7	7.0
Education	10.2	14.8	11.6	8.2	10.6	9.2	10.5	7.2	12.3
Geography	9.6	8.8	6.6	8.5	6.2	8.8	9.8	11.6	17.0
Law	9.2	4.8	19.0	2.8	11.0	10.4	8.3	6.0	11.1
Library Science	13.9	-	-	-	-	-	40.0	14.3	0.0
Physical Education	17.9	0.0	12.5	10.7	20.6	29.7	19.0	26.8	17.0
Political Science and Public Administration	5.1	4.0	4.3	4.8	3.7	4.7	5.1	4.9	8.0
Psychology	10.5	10.9	11.1	9.3	11.3	8.8	11.8	9.8	11.3
Social Welfare	8.4	11.1	8.3	3.6	5.9	13.9	5.4	2.5	15.6
Sociology	5.3	2.7	3.2	2.8	2.5	4.9	6.2	7.1	8.7
Other*	7.5	11.1	4.5	10.6	13.2	7.6	8.6	6.5	3.5
Total	8.7	9.2	8.4	6.8	8.1	8.0	9.5	8.3	10.5

* Includes Canadian Studies, Journalism and Communication, Urban and Regional Planning.
Source: Canadian Association of Graduate Schools.

Table 22

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in Engineering and Applied Sciences by Discipline 1968-1975

Discipline	Average 1968 to 1975	1968	1969	1970	1971	1972	1973	1974	1975
Aerospace Science	14.6	15.9	6.0	12.9	16.3	9.1	23.3	17.4	22.7
Chemical Engineering	20.0	11.5	12.9	17.1	19.7	22.5	30.1	26.5	23.5
Civil Engineering	18.1	10.9	13.3	14.0	13.3	25.2	25.7	24.9	21.0
Electrical Engineering	16.4	11.6	9.2	15.4	15.6	18.2	22.2	22.9	17.1
Mechanical Engineering	18.2	12.9	14.8	19.4	15.3	17.5	21.8	24.3	19.8
Other*	16.7	17.2	11.9	16.3	17.4	21.1	19.4	16.7	12.6
Total	17.4	12.7	11.6	15.9	16.2	20.2	23.2	22.3	17.7

* Includes Engineering Design, Environmental Studies, Industrial and Mining Engineering, and Metal and Materials Science.
Source: Canadian Association of Graduate Schools.

Table 23

Ratio Between Doctoral Degrees Awarded and Ph.D. Enrolment in the Physical Sciences by Discipline, 1968-1975

Discipline	Average 1968 to 1975	1968	1969	1970	1971	1972	1973	1974	1975
Astronomy	15.7	35.7	16.7	9.1	3.2	6.1	21.7	37.5	11.5
Chemistry	22.7	18.6	18.5	18.2	26.5	22.9	29.1	27.2	24.3
Computer Science	11.6	12.9	2.6	1.3	12.7	9.8	12.6	15.2	16.4
Geology	15.2	20.3	13.9	13.8	13.9	15.0	20.0	11.9	14.1
Mathematics	15.2	11.4	11.2	10.4	16.0	17.5	18.8	22.1	17.3
Physics (including Meteorology)	20.3	16.5	16.1	18.3	20.4	23.7	28.1	20.6	20.1
Total	19.1	16.8	15.5	15.5	20.6	20.1	24.4	21.8	19.7

Source: Canadian Association of Graduate Schools.

Table 24

Ratio between Doctoral Degrees Awarded
and Ph.D. Enrolment in the Life Sciences by Discipline, 1968-1975

Discipline	Average 1968 to 1975	1968	1969	1970	1971	1972	1973	1974	1975
Agriculture	13.3	100.0	12.8	6.7	13.0	12.5	21.7	10.5	14.3
Anatomy	20.5	8.9	17.8	12.7	28.3	34.1	27.5	12.2	22.7
Animal Science	20.5	5.9	14.3	12.5	30.0	25.9	37.0	26.1	19.6
Biochemistry	23.6	17.1	16.9	19.0	26.9	33.9	26.4	23.8	30.9
Biology	15.6	9.9	11.2	13.1	14.7	21.1	20.3	14.3	18.4
Biophysics	19.0	22.2	5.0	13.2	24.6	34.1	13.3	21.1	19.0
Botany	19.9	15.5	13.4	16.6	14.7	26.0	28.6	36.5	23.8
Dentistry	12.8	0.0	0.0	0.0	14.3	36.4	20.0	16.7	8.3
Entomology	18.9	10.2	23.3	27.8	18.2	12.5	19.1	21.6	22.0
Food Science	18.0	6.3	14.8	24.2	18.8	13.9	24.1	21.9	15.7
Forestry	15.3	25.0	11.5	22.4	11.8	8.2	24.4	12.0	11.1
Genetics	20.8	14.6	13.3	39.3	4.0	23.8	55.6	13.3	14.3
Marine Science	15.3	8.1	7.8	5.3	18.4	14.3	54.5	29.0	22.9
Medicine	20.3	16.0	30.2	15.4	7.4	15.8	64.7	28.6	0.0
Microbiology & Immunology	20.8	23.7	15.5	21.9	25.0	14.2	24.6	20.4	22.9
Pathology	18.1	8.7	12.5	17.5	13.3	11.8	27.6	30.4	26.9
Pharmacy/Pharmacology	22.6	14.2	14.4	12.3	21.7	34.5	33.7	28.6	29.7
Physiology	19.8	5.9	11.7	12.5	23.9	22.5	37.6	30.2	20.7
Plant Science	21.2	15.8	19.3	38.3	18.5	17.4	18.0	23.1	23.4
Public Health	17.4	16.7	9.1	13.0	35.0	15.8	18.2	9.1	25.0
Soil Science	20.0	8.0	11.9	19.3	25.0	32.6	34.2	23.7	11.6
Surgery	18.9	16.7	12.0	30.8	8.7	12.5	44.4	44.4	0.0
Veterinary Medicine	16.2	7.7	8.3	6.7	36.4	7.7	36.4	21.4	12.1
Zoology	16.9	16.1	10.6	12.0	15.2	18.9	16.2	21.0	22.2
Other	15.9	0.0	27.6	23.8	7.1	19.4	12.4	17.5	14.4
Total	19.0	13.8	14.0	17.2	18.8	22.1	24.8	21.5	20.3

Source: Canadian Association of Graduate Schools

Table 25

Ratio Between Doctoral Degrees Awarded and Doctoral Enrolment
by Selected Universities and Four Fields of Study, 1969-70 to 1975-76

University	8 Year Average	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
Laval:								
Humanities	6.8	6.0	7.2	5.7	8.4	6.7	5.1	8.6
Social Sciences	4.7	11.7	0.8	2.0	5.2	4.0	7.7	4.5
Physical and Applied Sciences	16.7	13.2	13.8	20.0	17.6	21.6	22.6	17.5
Life Sciences	15.7	12.3	16.7	25.6	15.3	26.6	17.6	11.5
Total	9.7	9.8	8.8	10.1	10.4	11.7	11.2	9.3
Montreal:								
Humanities	5.1	4.3	4.8	7.3	3.2	5.4	5.4	6.4
Social Sciences	4.9	6.8	4.1	6.1	2.5	4.4	4.4	6.6
Physical and Applied Sciences	14.1	9.4	11.5	17.4	6.0	20.8	20.8	15.9
Life Sciences	18.2	18.5	21.7	17.6	16.5	20.0	20.0	18.1
Total	7.5	6.9	6.9	9.3	4.4	8.7	8.7	8.7
McGill:								
Humanities	5.8	3.5	4.5	3.6	9.3	6.7	6.1	9.2
Social Sciences	9.9	7.5	6.8	7.6	12.2	13.2	9.2	7.5
Physical and Applied Sciences	18.4	10.4	16.8	19.6	18.8	23.8	15.6	18.7
Life Sciences	21.6	18.0	16.3	15.6	22.4	32.6	25.2	24.2
Total	13.8	10.1	11.3	11.6	15.4	17.7	12.9	14.0
Toronto:								
Humanities	8.3	7.5	7.0	7.9	8.4	7.9	9.9	11.2
Social Sciences	8.0	8.9	6.0	6.7	6.9	8.5	6.7	10.5
Physical and Applied Sciences	18.3	16.0	15.2	18.0	20.5	20.7	20.0	19.0
Life Sciences	17.7	8.6	18.4	18.4	23.2	19.3	21.5	22.1
Total	11.4	10.2	10.5	11.1	11.9	11.7	11.6	13.2
Alberta:								
Humanities	7.9	5.1	6.8	11.1	9.9	7.1	9.0	10.2
Social Sciences	17.0	14.7	15.1	16.1	17.5	21.0	15.3	18.9
Physical Sciences	21.5	14.5	17.1	19.5	25.2	31.4	30.6	17.5
Life Sciences	21.2	19.4	17.3	23.8	20.7	25.3	26.4	25.5
Total	17.4	14.0	14.8	17.6	18.7	21.5	19.2	18.1
British Columbia								
Humanities	7.4	3.9	5.8	4.8	6.5	10.0	13.5	13.0
Social Sciences	9.5	8.3	9.5	7.3	6.8	5.9	9.8	21.8
Physical Sciences	21.5	18.0	22.7	21.2	28.4	26.1	24.8	21.3
Life Sciences	19.9	14.9	16.6	18.5	21.3	31.0	18.5	23.2
Total	15.6	13.0	15.4	14.1	16.6	18.2	16.7	20.5